Symposium on model-based approach for alternative bidding zone configurations

Date: 8 March 2019  
Time: 10h00 – 16h00  
Place: Brussels, ENTSO-E premises, Avenue de Cortenbergh, 100; ground floor

MINUTES

Different modelling approaches – academic insights

Different modelling approaches were presented by following institutions:

* National Centre for Nuclear Research (NCBJ): *Model based approach - theory vs implementation*
* IAEW Aachen: *Model-based Approaches for Bidding Zone Re-Configurations – Challenges and (some) solutions*
* Politecnico di Milano/Politecnico di Torino/Terna: *Model-Based Approaches for Bidding Zones. Overview on available methodologies*

Presentations are available on ENTSO-E [website](https://www.entsoe.eu/events/2019/03/08/symposium-on-model-based-approach-for-alternative-bidding-zone-configurations).

**Panel discussion on different modelling approaches**

Participants of the panel included representatives from TSOs, NCBJ, IAEW Aachen, ENSIEL.

Panel leader notes that presenters have provided new interesting top down approaches consisting in identification of congestions resulting from zonal market simulations and usage of these congestions for finding alternative bidding zone configurations e.g. by clustering of nodal PTDFs. The new approaches are to be investigated further, however the short timing coming from Clean Energy Package (CEP) for preparation of methodology, assumptions and alternative bidding zone configurations need to be taken into account. Panelists discuss different simplifications and assumptions that could be considered in next BZ review.

Panel participants note that model-based approach complexity need to be balanced with short timeline and uncertainties resulting from simulation of future scenarios. Some panellists express their view that voltage stability and AC computation are least necessary, time coupling is more necessary than unit commitment and alinear approach could be enough (considering the computational complexity of dynamic constraints). Another presented challenge was the question which voltage levels should be considered or not as, for example, some lines on lower voltage levels (220kV, 110kV) may also be of regional importance. For example, some 220kV issues are in practice be solved by topology, but this has strong limitations in the modelling. None of the presented nodal pricing simulations was able to consider topological measures like line switching and all agreed that their proper consideration is an extremely challenging exercise. The consideration of N-1 security is also challenging from a computing point of view, but the most critical N-1 situations shall at least be considered. Impact of simplification can be different in different transmission systems. Input data shall be credible and of good quality. Modelling challenge can be addressed by comparing the data – what results models could produce based on historical data. RES future deployment shall be taken into account in scenarios, and it might affect the behavior of other power plants.

Panel participants discuss also the clustering issues. It is noted that different clustering algorithms may provide similar results only in case of high quality of input data e.g. not too flat LMPs due to simplifications and no outliers due to model errors. However, even with reliable input data, different clustering techniques may lead to different results as clustering approaches are heuristics depending on many implicit mathematical choices. In addition, the clustering results strongly differ from one hourly snap shot to another (and one framework scenario to another), especially in systems with high levels of fluctuating generation. Structural congestions shall be reflected in any (zonal or nodal) approach. It is noted that model-based approach is not a “magic tool” which provides optimal bidding zone delimitations but rather decision support tool.

Another statement was that the CEP regulation induces a high sensitivity of the exact line of the bidding zone border. With the CEP 70% rule, only cross-border capacities limit the market exchange to a relevant extent. The exact specification of the cross-border transmission lines has therefore a high impact on the market results. This makes it even more challenging to derive practicable model-based configurations as any nodal data and modelling of the future system will contain relevant inaccuracies.

**Future Bidding Zone review challenges**

ACER representative presents the *ACER’s suggestions for the bidding zone review.* Presentation is available on ENTSO-E [website](https://www.entsoe.eu/events/2019/03/08/symposium-on-model-based-approach-for-alternative-bidding-zone-configurations). He mentions that CEP improves the BZ review process - NRAs approve the assumption, if no consensus can be achieved, then ACER and the EC can step in. Time horizon - 3years. NRAs shall be involved from the beginning, and TSOs shall request guidance from NRAs and ACER on building the scenarios. Geographical scope - all EU. MS borders shall be considered in BZ configurations, TSOs shall strive for similar BZ sizes. TSOs shall mix model based and expert based approaches. Nodal scenario could be used as a benchmark - to see what improvements could be provided. Acceptable would be to focus on 10 simulations, for few weeks in the year. Indicators, where possible, shall be monetized. BZ focuses on 3years – 2023, any decision will be implemented not earlier than2025/6. TSOs shall provide NRAs with access to the data so they can make good decisions. Suggestion to organise another workshop with TSOs, NRAs and stakeholders - to agree on the high-level target.

**Panel discussion: how to use model-based approach in the next Bidding Zone review?**

Participants of the panel included representatives from TSOs, ACER, Eurelectric, E-control, Europex, EC.

Panel participants discuss the main points mentioned in ACER’s presentation.

TSOs shall do politically unbiased technical study, so NRAs can take the decision on implementable configurations. Participants discuss that if focus is on monetized indicators, criteria might be biased, delta economic surplus - focus only on day ahead, forward markets impacts are not taken into account. Non-monetized indicators shall be satisfactory or not (to be defined), to measure it improves or not (binary approach).

Panel participants discuss that context of BZ review has changed. EC will decide on BZ in 2026. The fair cross-border exchange shall be the main driver. Alternatives to bidding zone introduction (Action plans) are possible until the end of 2025, irrespective of the outcomes of BZ review. Study shall be simplified and understandable for all stakeholders. All TSOs are relevant, as the main focus shall be put on 70% issue.

The advantages of model-based approaches are a consideration of physical realities rather than politically biased assumptions; however, it is sensitive to input data and to used methods. Need to agree on most important simplifications. Calculation itself is not a challenge, assumptions require a political consensus.

The new requirement - need to achieve 70% cross-border capacity.

Panel participants discuss how model-based approach could be used in combination with expert based knowledge. Model based results do not provide perfect BZ configurations but provide useful insights to think out of the box, to model congestions and grid - to compare different scenarios, and also can serve as input to more political debate. It is important not to lose sense of reality (e.g. 20 BZ in France is not possible), study shall be understandable. It was underlined that firstly we need to build a high quality and trustable model covering both grid and market sides. When the model is ready, we will be able to simulate model based and all the simulation chain in the BZ Review.